6.0
Toxics Reduction Efforts—Current and Planned

States, tribes, communities, non-profit groups, EPA, and other federal agencies have launched a long-term recovery effort to improve the water, land, and air quality of the Basin. These groups are working together to enhance and accomplish critical ecosystem restoration efforts. A number of toxics reduction efforts are under way throughout the Basin as a part of this recovery effort.

States are Improving Water Quality and Reducing Toxics

State agencies are developing water quality improvement plans

The Federal Clean Water Act requires states to list all water bodies under their control that do not meet water quality standards. The states are then required to develop water quality improvement plans for those impaired waters so they will meet water quality standards. These plans, also known as total maximum daily loads (TMDLs) (Table 6.1), are in place or are being developed throughout the Basin for toxics.

Through implementation of these TMDLs, water quality is improved using a combination of pollution controls on point sources; programs to reduce non-point sources such as urban stormwater and agricultural runoff; and cleanup of known sources of contaminants such as abandoned mines or hazardous waste sites.

Oregon is using human health criteria to limit toxics

In October 2008, the Oregon Environmental Quality Commission recommended that the Oregon Department of Environmental Quality (ODEQ) revise the human health criteria as a part of Oregon's water quality standards. The Commission has asked for a proposed rule with a fish consumption rate of 175 grams per day (instead of the current rate of 17.5 grams per day) and a broader toxics reduction implementation strategy. This recommendation was a result of a two-year collaborative process led by EPA, ODEQ, and the Confederated Tribes of the Umatilla Indian Reservation. The recommended fish consumption rate of 175 grams per day represents approximately the 90th to 95th percentile of Oregon's fish-consuming populations, as indicated by studies of tribes, Asians, and Pacific Islanders in Oregon and Washington. [1]

ODEQ's water quality standards play an important role in maintaining and restoring environmental quality. Human health criteria are used to limit the amount of toxic pollutants that enter Oregon's waterways and accumulate in the fish and shellfish consumed by Oregonians. The criteria also serve as the framework for wastewater permits, nonpoint source reduction activities, stormwater permits, and sediment cleanup efforts. The criteria help ensure that people may eat fish and shellfish from local waters without incurring unacceptable health risks. A final rule on the revised criteria is expected in October 2009.

EPA and States are Using Permits to Control Toxics

The Clean Water Act's National Pollutant Discharge Elimination System (NPDES) program controls the quality of water discharged into the Basin from point sources such as wastewater treatment plants, mines, and pulp and paper plants. Federal, state, and local NPDES permits limit the amount of pollutants from municipal, industrial, and stormwater discharges so that the quality of the water body receiving the discharge is not impacted or further impaired. Facilities that have an NPDES permit must conduct routine monitoring and are fined or required to install pollution controls if their NPDES permit conditions for water quality are not met. However, data on the amounts of many toxics (including DDT, PCBs, and PBDEs) entering the Columbia River from stormwater and from municipal and industrial dischargers are limited.

Stormwater and erosion controls are increasingly important in urban and developing areas to keep contaminants from reaching lakes, rivers, and streams. This is done through stormwater NPDES permitting and a combination of best management practices (BMPs) and public education. Many communities and industries

Combined sewer overflow (CSO) outfall (photo courtesy of WADOE)

Table 6.1: Toxics TMDLs that have been approved or are under development in the Washington, Oregon, and Idaho areas of the Columbia River Basin

State	River	Toxics
Washington	Yakima	Chlorinated Pesticides (e.g., DDT) and PCBs
	Spokane	Metals, PCBs
	Okanogan	DDT, PCBs
	Walla Walla	Chlorinated Pesticides and PCBs
	Palouse	Chlorinated Pesticides and PCBs
	Lake Chelan	DDT, PCBs
	Mission Creek (Wenatchee)	DDT
	Columbia	Dioxins
	Similkameen	Arsenic
Oregon	Columbia	Dioxins
	Columbia Slough	Lead, PCBs, Dioxins, DDT, Dieldrin
	Coast Fork Willamette	Mercury
	Cottage Grove Reservoir	Mercury
	Pudding	DDT, Dieldrin, Chlordane
	Johnson Creek	DDT, Dieldrin
	Willamette	Mercury
	Row River	Mercury
	Snake River	DDD, DDE, DDT, Dieldrin
Idaho	Salmon Falls Reservoir	Mercury
	Jordan Creek	Mercury
	East Fork Eagle Creek (North Fork Coeur D'Alene)	Metals
	Snake River	DDD, DDE, DDT, Dieldrin
	Columbia	Dioxins

are adopting innovative stormwater management techniques that improve the quality of the discharged water before it reaches lakes, rivers, and streams. These include porous pavement to reduce runoff; diversion of runoff from storm sewers into natural systems (e.g., vegetated buffers); retention and treatment wetlands; and filtration through vegetated swales. Such stormwater management practices also reduce flooding, erosion, and direct runoff of contaminants to waterways.

Federal Government and States are Working to Clean up Hazardous Waste in the Basin

Several contaminated sites in the Basin are being cleaned up and managed under EPA Superfund or state toxic cleanup programs. For example, since 1983, EPA has been working with the State of Idaho, the Coeur d'Alene Tribe, and mining companies to clean up the Bunker Hill Mining and Metallurgical Superfund site in the Coeur d'Alene Basin. The area's many mines were once a primary source of our nation's zinc, copper, lead, and precious metals. A comprehensive, integrated approach, using all available regulatory tools such as the Clean Water Act and the Comprehensive Environmental Response, Compensation and Liability Act, has been employed to help protect human health and the environment in this heavily contaminated watershed.

Cleanup of an Idaho mine near the Salmon River (photo courtesy of EPA)

Furthermore, in the Upper Columbia River above Grand Coulee Dam, several investigations and cleanups are ongoing in the areas that drain into Lake Roosevelt. In Montana, cleanup efforts in the upper Clark Fork and Flathead basins have reduced copper, lead, arsenic, and zinc contamination into the Columbia River tributaries. [2] In the Middle Columbia River, the U.S. Department of Energy (DOE) is working to prevent contaminated groundwater on the Hanford Nuclear Reservation from reaching the Columbia River. Work is also under way to clean up contaminated sediment from the Portland Harbor Superfund site, located on the lower Willamette River near its confluence with the Lower Columbia to reduce PCBs, DDT, and many other toxic contaminants.

In addition to the federally listed Superfund sites, each state manages its own list of contaminated site cleanup projects. States work with the federal agencies and with businesses and property owners to develop site assessment and cleanup plans and then conduct cleanup activities. Many contaminated sites in the Basin are in various stages of planning and cleanup for a variety of contaminants. Two examples of PCB-contaminated sites on the Columbia River are the Bradford Island site at the Bonneville Dam and the Alcoa plant in Vancouver, Washington. An accelerated cleanup is planned by the State of Washington at the Alcoa site, where sediment removal is scheduled for November 2008.

Upper Columbia River Investigation and Cleanup

EPA is studying hazardous waste contamination in the Upper Columbia River from the U.S./Canadian border down to Grand Coulee Dam and the surrounding upland areas. The investigation and cleanup site under EPA Superfund authority, located in northeastern Washington, consists of 150 miles of river and lake environment. From about 1930 to 1995, the Teck Cominco smelter in Trail, B.C., located 10 miles north of the U.S./Canadian border, discharged millions of tons of metals-laden slag and other wastes directly into the Columbia River. The waste discharged from the facility was carried downstream into the United States and has settled in the River's low-flow areas, beaches, and stream banks, potentially impacting the ecosystem in and around the Upper Columbia River.

In 2004, EPA began investigating the contamination problems in the Upper Columbia. In the first phase of the investigation, EPA collected over 400 sediment and 1,000 fish samples, along with samples from 15 beaches. Over the next several years, additional sediment, fish, and beach samples will be collected.

Bradford Island PCB Cleanup

In 1997 and 1998, USGS biologists found higher levels of PCBs in osprey eggs collected near Bonneville Dam than in eggs from other reaches of the Columbia River. [3] Also, in the late 1990s, very high levels of PCBs were found in crayfish collected near Bradford Island, which is part of the Bonneville Lock and Dam Complex. Based on this information, the Oregon Department of Human Services issued an advisory cautioning people against consuming crayfish, clams, or other bottom-dwelling organisms between Bonneville Dam and Ruckel Creek, about a mile upstream.

The PCB contamination came from disposal of electrical equipment on Bradford Island and the Columbia River during the 1950s. In response, the USACE removed PCB-containing equipment and some sediments in 2002. In 2007, the Corps completed the removal of PCB sediment "hot-spots" over a one-acre area that was estimated to contain over 90 percent of the PCB contamination on Bradford Island. The Corps continues to work with ODEQ to evaluate and remove the remaining PCB-contaminated sediments.

Portland Harbor Superfund Cleanup Site

The Portland Harbor Superfund site study area is focused on an 11-mile stretch of the lower Willamette River from downtown Portland, Oregon, to the Columbia River. Sediments at the site are contaminated with metals, pesticides (e.g., DDT), polycyclic aromatic hydrocarbons (PAHs), PCBs, and dioxin/furans from a variety of sources. EPA is overseeing a remedial investigation and feasibility study being conducted by a group of potentially responsible parties referred to as the Lower Willamette Group. EPA is the lead agency for investigating and cleaning up contaminated sediment in the Willamette. The ODEQ is the lead agency for investigating and cleaning up the upland sites that are potential sources of contamination to the Willamette. A draft feasibility study, which will evaluate cleanup strategies and methods, is targeted for late 2010. EPA will then issue a proposed cleanup plan for public comment before making a final decision on the harbor-wide cleanup. In addition to the harbor-wide investigation, several early actions are under way to clean up individual sites that need more immediate attention.

VISIT THE WEB

Additional information about the Upper Columbia, Bradford Island, and Portland Harbor investigations and cleanups can be found by visiting EPA's Columbia River Basin website: http://www.epa.gov/region10/columbia.

State and Local Partnerships are Working to Improve Farming Practices

Partnerships and volunteer efforts are reducing runoff from farms

The Columbia River Basin supports some of the most important agricultural regions in the United States. Clean water for food production is critical, but agricultural practices can degrade water quality by contributing eroded soil, nutrients, and pesticides to nearby waters. Agricultural BMPs are used to improve water quality, often with the added benefits of improving water and soil conservation and soil fertility.

BMPs are usually developed and implemented by partnerships between farmers, local conservation districts and university extension services, state and federal agriculture and water quality agencies, tribal governments, and local watershed groups. They have become a critical component of TMDLs in agricultural watersheds such as the Yakima River.

The agricultural community can be leaders in reducing toxics in the Columbia River Basin. Voluntary agricultural activities provide a great opportunity to reduce toxics in the Basin by reducing legacy toxics such as DDT and current-use pesticides, especially organophosphates. Toxic contaminants reach the Columbia River Basin from sediment transport and deposition and have contributed to the long-time degradation of water quality and fish and wildlife habitat. Sediments may transport trace metals (such as arsenic and copper) and organic compounds (such as polycyclic aromatic hydrocarbons [PAHs], PCBs, and pesticides such as DDT, chlordane, and atrazine). Most of these contaminants cling to particles suspended in the water and settle to the bottom; therefore, their concentrations in sediments are typically much higher than in water.

Yakima Valley irrigation ditch before implementation of BMPs (left) and Yakima Valley irrigation ditch with BMPs to control erosion and reduce runoff (right) (photos courtesy of the Confederated Tribes and Bands of the Yakama Nation Environmental Management Program)

Washington is working to control soil erosion and reduce pesticide runoff in the Yakima River Basin

The Yakima River Basin serves as a successful example of sediment cleanup and pesticide reduction efforts. [4] DDT was used extensively in the Yakima Valley from the 1940s until it was banned in 1972, and it persists in Yakima Basin soils. Erosion of these soils allows pesticides to reach the aquatic environment, where they accumulate in fish and in the people and wildlife that eat fish. Recognizing this, the WADOE, Yakima Valley growers, water purveyors, local conservation districts, and the Confederated Tribes and Bands of the Yakama Nation worked together to implement BMPs to reduce DDT and other pesticides by modifying irrigation practices to reduce the amount of soil carried to the Yakima River by irrigation returns.

DDT clings to organic particles in soil; therefore, reducing soil erosion from agricultural fields and the associated sediments should reduce runoff polluted with pesticides like DDT.

After the BMPs were initiated, suspended sediment loading to the Lower Yakima River during the irrigation season was reduced between 67 and 80 percent. Total DDT

concentrations in fish were reduced by 30 to 85 percent in the same area after implementation of the BMPs. The accompanying photos show soil eroded by surface irrigation into a return drain before BMPs were implemented; later, with BMPs, the soil is retained by a grass filter strip between crop and drain.

Oregon is working with farmers to reduce pesticide runoff

Another example of toxics reduction from agriculture in the Columbia River Basin is Oregon's Pesticide Stewardship Partnerships. These partnerships are voluntary collaborations to reduce pesticide use and improve water quality. Such collaborations typically include local watershed councils, ODEQ, agricultural growers, Oregon State University (OSU) Extension Service, and tribes. Pilot projects in the Columbia Gorge, Hood River, and Fifteen-Mile Creek near The Dalles, Oregon, showed substantial improvements in water quality due to changes in pesticide management and application practices. In addition, ODEQ has launched Pesticide Stewardship Partnerships in six watersheds in the Basin: the Walla Walla, Clackamas, Pudding, Yamhill, Willamette, and Hood River Basins.

For example, the Walla Walla partnership has reduced pesticide concentrations in Oregon's Walla Walla River Basin. [5] In 2006, high levels of five toxic pesticides were found in tributaries of the Little Walla Walla River. In response, the ODEQ, OSU Extension Service, fruit growers (Blue Mountain Horticultural Society), and Walla Walla Basin Watershed Council worked together to monitor and control current-use pesticides that reach surface water by spray drift and runoff from fruit orchards. To accomplish this, ODEQ and its partners installed vegetated buffers adjacent to surface waters, switched to using less toxic pesticides and mineral oil, provided individualized applicator training, and calibrated sprayers to avoid overspray.

The monitoring results in 2007-2008, after implementation of the practices described above, showed dramatic declines in several pesticides, including large reductions of one of the most toxic pesticides, chlorpyrifos (Figure 6.1).

In addition, ODEQ has worked with partners in the Walla Walla Basin to conduct two agricultural pesticide collection events to remove unwanted waste pesticides from the watershed. Over 17,000 pounds of pesticide waste were collected and properly disposed of from these events.

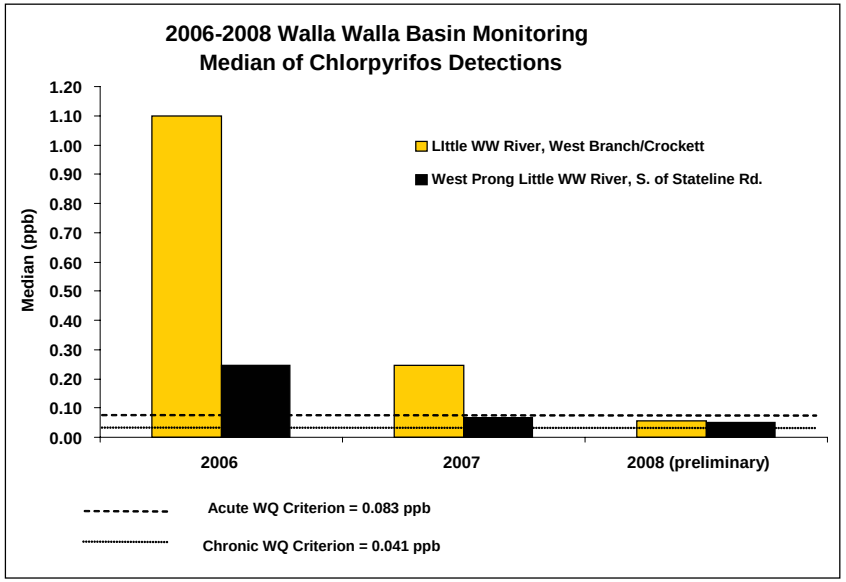

Figure 6.1: Concentrations of chlorpyrifos dropped after measures were implemented to keep pesticides from reaching nearby surface waters in Oregon.

State and Local Governments are Removing Toxics from Communities

The State of Washington passed one of the first state bans on PBDEs in the summer of 2007. This ban is part of the state's overall initiative to reduce the threat from persistent and bioaccumulative toxics (PBTs) by keeping toxics out of products and industrial processes. The ban is being phased in over a two-year period, with an emphasis on finding a safer and feasible alternative. Oregon is also working to reduce and control PBTs, particularly for large municipal wastewater dischargers. All of the Basin states have mercury reduction

programs to promote recycling of thermometers and fluorescent lamps containing mercury, and each state works with dentists, hospitals, and vehicle recyclers to capture and recycle mercury. For example, separating mercury from wastewater in dental offices prevents mercury from reaching wastewater treatment plants and the Columbia River. Oregon and Washington also sponsor collection of mercury recovered by small-scale mineral miners from streams and rivers.

State, county, and local toxics reduction programs help businesses and private citizens reduce the use of toxic chemicals and ensure the proper disposal of hazardous wastes such as pesticides, solvents, batteries, electronics, PBDE-containing materials, and pharmaceuticals. For example, Idaho's pesticide disposal program prevents thousands of pounds of unusable pesticides from reaching the environment each year. Under this program, the Idaho State Department of Agriculture assists growers, homeowners, dealers, and applicators with the disposal of pesticides that have become unusable because of expiration, cancellation, deterioration, or crop changes. Individuals can dispose of up to 1,000 pounds of pesticide at no charge. Permanent collection points are established throughout the state; materials are collected annually and taken to a licensed facility for incineration. From 2003 to 2007, 328,000 pounds of unusable pesticides have been collected, and over 870,000 pounds have been collected since the program's inception in 1993 (Figure 6.2). [6] The program also collects and recycles empty pesticide containers. Washington and Oregon are also sponsoring pesticide take-back programs, which have recovered thousands of pounds of banned pesticides such as DDT.

Another Idaho initiative is the Idaho Department of Environmental Quality's (IDEQ's) school laboratory and chemical cleanup project. This project assists schools in understanding and implementing best practices for managing and disposing of their large stockpiles of hazardous chemicals and wastes, including mercury.

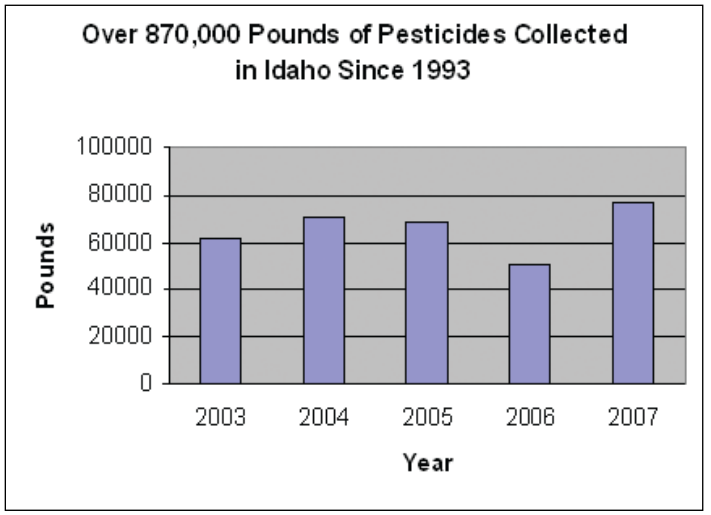

Figure 6.2: Amount of pesticides collected under Idaho's pesticide disposal program (2003–2007).

At the county level, Clark County, on the Lower Columbia River in Washington, recently implemented an unwanted medications take-back program that allows residents to drop off unwanted pharmaceuticals at participating pharmacies. The drugs are then incinerated at a licensed facility. Washington has implemented a pilot pharmaceutical take-back program in King County (through 2008) and plans to expand it to a statewide program. In Oregon, a proposal may be presented to the 2009 legislative session for a pharmaceutical take-back program. These partnerships between state and local governments, pharmacies, medical facilities, and the U.S. Drug Enforcement Administration reduce pharmaceutical pollution in wastewater and unlined solid waste landfills which can contaminate groundwater and surface waterways.

Oregon and Nevada are Reducing Industrial Mercury Emissions

A number of regulatory agencies in the Basin have recently introduced controls on industrial mercury discharges to the air. EPA expanded its Toxics Release Inventory (TRI) reporting requirements in 1999 to include mercury reporting for a variety of industries. The TRI data showed that some of the highest discharges of mercury in the country were in or bordering the Basin and that the single highest emitter of mercury was a cement plant in eastern Oregon. To reduce these emissions, ODEQ worked with the cement plant operators, who, through a 2008 mutual agreement and order, agreed to "…endeavor to meet a goal of 85% reduction in mercury emissions on a rolling 12-month average basis…". The agreement also stipulates that if the goal is not met within a specified timeframe, plant operators will develop an action plan and implement corrective actions in a further effort to achieve the 85 percent reduction. ODEQ will oversee these efforts to determine whether the cement plant "…exhaust[s] all reasonable alternatives…" to meet the goal. [7]

Approximately a dozen mines in the Battle Mountain Mining District in northern Nevada produce 11 percent of the world's gold and 74 percent of the nation's gold. [8] TRI reporting showed that these gold mining operations were releasing a total of over 12,000 pounds of mercury per year. Between 2002 and 2005, EPA and the Nevada Department of Environmental Protection worked with four mining companies to set up a program of voluntary reductions for mercury emissions that resulted in an 82 percent decrease of mercury discharges to air at these mines. In March 2008, the State of Nevada enacted the nation's first regulations limiting mercury air emissions from precious metal mining operations. These regulations set limits on mercury emissions from all the mines in the Battle Mountain District.

The only coal-fired power plant in the Columbia River Basin is located near the Columbia River at Boardman. This plant discharges an average of 168 pounds of mercury to the atmosphere per year. [9] In December 2006, Oregon adopted regulations applicable to coal-fired power plants that require the Boardman plant to control and reduce mercury emissions by 90 percent by 2012 and cap state-wide mercury emissions from coal-fired power plants by 2018. There are also three coal-fired power plants near the boundary of the Basin (one in Washington and two in Nevada) that could contribute some mercury load to the watershed, depending upon their emissions and prevailing wind patterns.

Idaho Agencies and Kootenai Tribe are Monitoring Toxics in Fish, Water, and Air

For several years, the State of Idaho has monitored rivers, lakes, and reservoirs for a number of toxics. In 2006, IDEQ sampled 15 large rivers for mercury in fish. In 2007, IDEQ sampled 50 lakes and reservoirs for arsenic, mercury, and selenium in fish tissue. In 2008, an additional 34 large rivers were sampled for arsenic, mercury, and selenium in both fish and water; the water samples were also tested for methylmercury.

IDEQ has also conducted or supported other local efforts, most notably in support of the Salmon Falls Creek mercury TMDL, submitted to EPA in December 2007 and approved in February 2008. The state's air quality program has also been conducting some mercury deposition monitoring.

Other noteworthy studies include the following:

- The Kootenai Tribe of Idaho has conducted studies of numerous contaminants in sturgeon, fish, water, sediment, and lower food web organisms from the Kootenai River between 1999 and 2007. The tribe has also studied biomarkers in sturgeon for the effects of contaminants.
- The Idaho Department of Fish and Game conducted studies of contaminants and biomarkers in Kootenai River adult and juvenile sturgeon in 1997 and 1998.
- Idaho Power Company has conducted several studies of contaminants in the Snake River area along the Oregon-Idaho state line.

PCBs and Hydroelectric Facilities

Historically, many pieces of electrical equipment used to generate power at dams in the Columbia River Basin used cooling and insulating oil that contained PCBs. In recent years, efforts have been made to reduce the presence of, and risk from, PCBs. These efforts include reducing or removing PCBs from electrical equipment; conducting operator self-assessments and EPA inspections; confirming that turbine oil does not contain PCBs; and reducing the potential for PCB spills. EPA will continue to work with the operators of hydroelectric facilities to better understand the remaining risk of PCBs at dams.